

# Risk Factors Associations of Metabolic Syndrome

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**Abstract**— *Background: Metabolic syndrome (syndrome x) A clustering of dyslipidemia , elevated blood pressure , impaired glucose tolerance , and central obesity which was varied somewhat in specific elements ,but in general they include a combination of multiple and metabolic risk factors. The most widely recognized risk factors are elevated blood pressure, atherogenic dyslipidemia, and elevated plasma glucose. Regardless of the cause, the syndrome recognized individuals at an elevation of these risk factors. The magnitude of increased risk can vary according to the components of the syndrome present as well as the other, non-metabolic syndrome risk factors in a particular person. The association of the metabolic syndrome with demographic characteristics and the metabolic syndrome risk increased with age, BMI and weight gain which are another important risk factors. Obesity has consistently been reported as a risk factor for metabolic syndrome, it is an important, easily observed, and measurable risk factor .it was the only fact that remained significantly associated with metabolic syndrome in all age, race and sex groups. Higher BMI and weight gain over time are associated with poorer blood pressure, higher fasting blood glucose, and dyslipidemia with the remaining atherosclerotic changes complications (hypertension CVD, and nephropathy) have been found to be associated with this syndrome.*

**Keywords**—*metabolic syndrome, dyslipidemia, obesity, risk factors.*

## OBJECTIVE

The aim of this study was to describe the association of the metabolic syndrome with the demographic characteristics (age, sex), BMI, and to identify other risk factors for the development of that syndrome.

## SETTING

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## I. INTRODUCTION

Metabolic syndrome (syndrome x) is a clustering of dyslipidemia , elevated blood pressure , impaired glucose tolerance , and central obesity which are varied somewhat in specific elements according to the components of the syndrome in different individuals at an elevation of these risk factors regardless of the causes.

**The association of the metabolic syndrome with obesity;**

Obesity has consistently been reported as a risk factor for metabolic syndrome, it is an important, easily observed, and measurable risk factor. It was the only fact that remained significantly associated with metabolic syndrome in all age, race and sex groups. Higher BMI and weight gained over time are associated with poorer blood pressure, higher fasting blood glucose, and dyslipidemia with the remaining atherosclerotic changes complications, CVD, and nephropathy.

## Aim of the study

The aim of this study is to describe the association of the metabolic syndrome with the demographic characteristics (age, sex), BMI, and to identify other risk factors for the development of that syndrome.

## II. PATIENTS AND METHODS

80 patients with metabolic syndrome from Baghdad city , 40 male , 40 female , aged (40-70 years ) classified into six age groups with four years interval for each , were

surveyed from June 2020-January 2021 for height, weight, BMI ,BP, lipid profile, TG, FBS, uric acid, and cortisol hormone estimation. Another twenty healthy control group as a comparative study was subjected to the same investigation.

### III. RESULTS

In comparison to the healthy control group , high significant differences were found between , low plasma HDL-cholesterol, high uric acid ,high fasting plasma glucose, high cortisol hormone levels with a P-values of (0.0001, 0.016, 0.0001, 0.0001respectivly) Table(1).

Female patients; besides the already mentioned parameters, LDL-cholesterol also shows a higher significance with a P-value of 0.025 Table (2).

Table (1).Mean  $\pm$ SD and P values of some biochemical parameters in two groups\*Significant at 0.05 Level using t-test for two independent means of significance.

Male	M.S	Controls	P values
	Mean $\pm$ SD	Mean $\pm$ SD	
FBS(mmol/l)	10.47 $\pm$ 3.02	5.24 $\pm$ 0.85	0.0001*
Uric acid ( $\mu$ mol/l)	286.90 $\pm$ 72.31	227.90 $\pm$ 30.65	0.016*
Triglycerides(mmol/l)	1.69 $\pm$ 0.75	1.58 $\pm$ 0.21	0.663
Cholesterol(mmol/l)	5.18 $\pm$ 0.96	4.92 $\pm$ 0.64	0.416
HDL-C(mmol/l)	1.01 $\pm$ 0.14	1.26 $\pm$ 0.07	0.0001*
LDL-C(mmol/l)	3.41 $\pm$ 0.89	2.96 $\pm$ 0.64	0.139
Cortisol(ng/ml)	183.06 $\pm$ 22.13	67.40 $\pm$ 4.90	0.0001*

Table (2).Mean  $\pm$ SD and P values of some biochemical parameters in two groups \*Significant at 0.05 level using t-test for two independent means of significance

Female	M.S	Controls	P values
	Mean $\pm$ SD	Mean $\pm$ SD	
FBS(mmol/l)	10.71 $\pm$ 3.15	5.52 $\pm$ 0.59	0.0001*
Uric acid ( $\mu$ mol/l)	284.02 $\pm$ 66.92	233.30 $\pm$ 28.69	0.024*
Triglycerides (mmol/l)	1.76 $\pm$ 0.69	1.51 $\pm$ 0.15	0.269
Cholesterol (mmol/l)	5.30 $\pm$ 1.02	4.79 $\pm$ 0.64	0.141
HDL-C(mmol/l)	0.99 $\pm$ 0.14	1033 $\pm$ 0.07	0.0001*
LDL-C(mmol/l)	3.52 $\pm$ 0.95	2.78 $\pm$ 0.63	0.025*
Cortisol(ng/ml)	215.80 $\pm$ 57.07	69.40 $\pm$ 5.93	0.0001*

Table (3) shows that ages does not have any significant difference in the distribution of diabetes in those patients (p .values > 0.05) in both sexes.

Table (3).Number and percent of complication.

complication	number	Percent %
hypertension	40	32
Cerebrovascular disease	17	13.6
nephropathy	13	10.4
Gout, osteomalacia	10	8

Table (4). Distribution of diabetes according to age groups in male. \*Significant at 0.05 level using Pearson Chi-squared test.

Male age (year)	M.S		Controls		P values
	percent	number	percent	number	
40-44	5	2	10	1	0.610
45-49	15	6	20	2	
50-54	17.5	7	30	3	
55-59	27.5	11	10	1	
60-64	25	10	10	1	
<65	10	4	20	2	
Mean $\pm$ SD	56.154 $\pm$ 6.86		54.50 $\pm$ 8.61		

Table (5). Distribution of diabetes according to age groups in female. \*Significant at 0.05 level using Pearson Chi-squared test

Female age (year)	M.S		Controls		P values
	percent	number	percent	number	
40-44	4	10	4	40	0.182
45-49	5	12.5	1	10	
50-54	8	20	3	30	
55-59	7	17.5	1	10	
60-64	9	22.5	1	10	
<65	7	17.5	0	0	
Mean $\pm$ SD	56.10 $\pm$ 8.38		48.70 $\pm$ 6.65		

Moreover increased body mass index and high blood pressure (p values 0.0001) were found to be associated significantly with the metabolic syndrome in both sexes, but without any sex difference Table(6).

Table (6). Mean  $\pm$ SD, and P value of height, weight, systolic blood pressure, diastolic blood pressure in two groups. \*Significant at 0.05 level using t-test for two independent means of significance.

Male	M.S	Controls	P values
	Mean $\pm$ SD	Mean $\pm$ SD	
Height(cm)	169.18 $\pm$ 5.32	175.30 $\pm$ 6.07	0.003*
Weight(kg)	91.03 $\pm$ 8.72	77.70 $\pm$ 6.07	0.0001*
BMI	31.74 $\pm$ 1.51	25.25 $\pm$ 0.49	0.0001*
SBP(mmHg)	158 $\pm$ 10.67	122 $\pm$ 2.58	0.0001*
DBP(mmHg)	92.25 $\pm$ 3.19	82 $\pm$ 2.58	0.0001*

Table (7). Mean  $\pm$ SD, and P value of height, weight, systolic blood pressure, diastolic blood pressure in two groups. \*Significant at 0.05 level using t-test for two independent means of significance.

Female	M.S	Controls	P values
	Mean $\pm$ SD	Mean $\pm$ SD	
Height(cm)	163.32 $\pm$ 5.53	166.40 $\pm$ 24	0.094

Weight(kg)	87.82±9.28	69.90±3.4	0.0001*
BMI	32.83±1.54	25.23±0.7	0.0001*
SBP(mmHg)	154.25±10.59	122.50±2.	0.0001*
DBP(mmHg)	91.38±2.26	82.50±2.6	0.0001*

#### IV. CONCLUSION

An emergent epidemic of global obesity should attract clinicians attention to recognized the syndrome and aggressively manage these individuals with life style modification ,education and if necessary , pharmacological intervention .metabolic syndrome is increasingly being recognized as a constellation of clinical criteria that predispose individuals to a significant cardiovascular risk and the development of type two diabetes.

1. Metabolic syndrome is increasingly being recognized as a constellation of clinical criteria that predisposes individuals to a significant cardiovascular risk and the development of Type 2 diabetes, hypertension.
2. Obesity is consistent predisposing risk factors.
3. Glucocorticoid cortisol hormone is another interesting parameter used for metabolic syndrome's investigation.

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